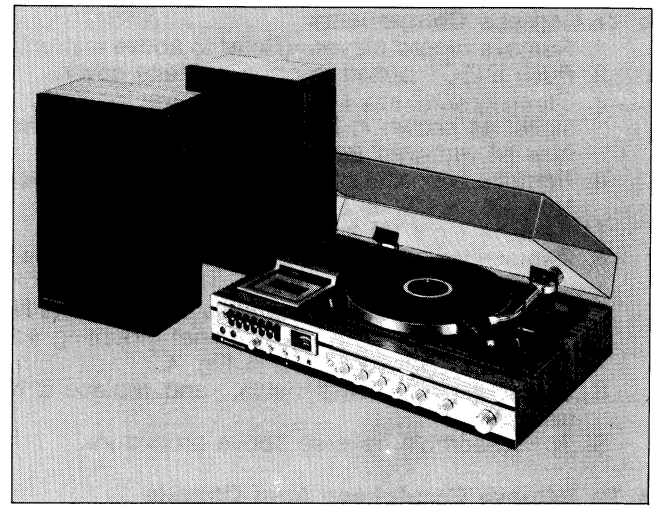
ORDER NO. TSD-7506-239

Service Manual

Compact Stereo

FM/AM/FM STEREO RADIO AND RECORD PLAYER WITH CASSETTE DECK

SG-2070L



Specifications

AMPLIFIER SECTION

Power Output	MPO	2 × 30 W (THD 1%, 4 ohms) 2 × 22 W (THD 1%, 8 ohms)
	RMS	2 × 23 W (THD 1%, 4 ohms) One Channel Driven 2 × 17 W (THD 1%, 8 ohms) One Channel Driven
	RMS	2 × 18 W (THD1 %, 4 ohms) Both Channel Driven 2 × 13 W (THD 1%, 8 ohms) Both Channel Driven
[Power Output	MPO	2 × 22 W (THD 1%, 8 ohms)]
[	RMS	2 × 17 W (THD 1%, 8 ohms) One Channel Driven]
[	RMS	2 × 13 W (THD 1%, 8 ohms) Both Channel Driven]

Frequency Response	10 Hz ~ 25 kHz, ±1.5 dB (DIN)
Input Sensitivity and Impedance:	
Phono	2 mV, 47k ohms
Mike	1 mV, 3k ohms
Aux	300 mV, 100k ohms
Tape	300 mV, 30k ohms
Rec Out and Impedance	DIN; 30 mV, 82k ohms
Tone Control:	
Bass	+10 dB ~ −10 dB at 50 Hz
Treble	+10 dB ~ −16 dB at 10 kHz

FM TUNER SECTION

Frequency Range	87.5 MHz ~ 108 MHz
Intermediate Frequency	10.7 MHz
Sensitivity	2.5 μV (IHF) 3.5 μV (S/N 26 dB, MOD 40 kHz) (DIN)
Image Ratio	45 dB (98 MHz)
Signal to Noise Ratio	60 dB (at 1 kHz, 60 dB, 40 kHz) (Unweighted) (DIN)
Distortion	0.6% (MONO) (at 1 kHz, 60 dB, 100%) 0.8% (STEREO) (at 1 kHz, 60 dB, 100%)
Stereo Separation	35 dB (at 1 kHz, 60 dB, 30%) ≧30 dB, 250 Hz ~ 6.3 kHz (60 dB, 30%) (DIN) ≧18 dB, 6.3 kHz ~ 12.5 kHz (60 dB, 30%) (DIN)

AM TUNER SECTION

Frequency Range	MW:	525 kHz ~ 1605 kHz (572 m ~ 187 m)
	LW:	145 kHz ~ 285 kHz (2070 m ~ 1050 m)
	SW:	5.9 MHz ~ 18 MHz (50.8 m ~ 16.7 m)
Intermediate Frequency	455 kHz [470 kHz]	
Sensitivity	MW:	100 μV/m for 50 mW (1 MHz)
	LW:	250 μV/m for 50 mW (220 kHz)
	SW:	8 μV for 50 mW (12 MHz)
Image Ratio	MW:	45 dB (1 MHz)
	LW:	43 db (220 kHz)
	SW:	15 dB (12 MHz)

RECORD PLAYER SECTION

Player System	Auto Return, Belt-Drive
Turntable	30 cm (12″)
Turntable Speeds	33-1/3 and 45 r.p.m., 2-speeds
Deviation of Turntable-speeds	+1.5%, −1.0% (DIN)
Phonomotor	Frequency Generated Servo DC Motor
Cartridge	Moving Magnet (EPC78SMBD)
Stylus	Diamond (EPS35STSD)
Stylus Pressure	1.5 grams ~ 2.0 grams
Frequency Response	20 Hz ~ 20 kHz (DIN)
Separation	23 dB (DIN)
Signal to Noise Ratio	60 dB (DIN-B)
Wow and Flutter	0.15% (DIN WTD)

TAPE DECK SECTION

Deck System	Auto Stop Cassette System
Track System	4 Track, 2 Channel
Recording System	AC Bias, 50 kHz
Erasing System	AC Erase, 50 kHz
Tape Speed	4.75 cm/sec (1-7/8 i.p.s.)
Frequency Response	25 Hz ~ 13 kHz (NORMAL) 25 Hz ~ 15.5 kHz (CrO_2)
Signal to Noise Ratio	≧ 35 dB (DIN-A) 55 dB (DIN-B)
Wow and Flutter	0.15% WRMS 0.35% (DIN)

POWER CONSUMPTION ..... 105 W

POWER SUPPLY ..... AC 110 V, 120 V, 220 V, 240 V, 50/60 Hz

DIMENSIONS (W × H × D)

Center Unit	622 mm × 183 mm × 434 mm (24-1/2″) × (7-7/32″) × (17-3/32″) without Dust Cover 622 mm × 105 mm × 434 mm (24-1/2″) × (4-1/8″) × (17-3/32″)

WEIGHT

Center Unit	14.0 kg (30 lb. 15 oz.)

SPEAKER SYSTEM

Speaker	2-way air-suspension
Dimensions (W × H × D)	296 mm × 451 mm × 166 mm (11-21/32″) × (17-3/4″) × (6-5/16″)
[Speaker	2-way air-suspension
Woofer	20 cm (8″) cone type
Tweeter	5 cm (2″) cone type
Impedance	8 ohms
Dimensions (W × H × D)	296 mm × 451 mm × 166 mm (11-21/32″) × (17-3/4″) × (6-5/16″)
Weight	3.6 kg (7 lb. 15 oz.) × 2]

Note: The items included in [ ] are specified for UK.

* Specifications are subject to change without notice for further improvement.

National Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

DISASSEMBLY INSTRUCTIONS

■ **To Remove Record Player**

Lift record player and unplug 5P connector jack and 2 pin plugs from PC board.

Note:
When removing turntable, be sure to take off the belt from the capstan as shown in Fig. 1.

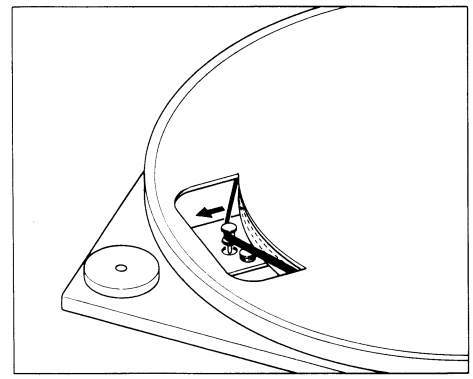


FIG. 1

■ **To Replace Components**

1. Remove record player. (Refer to above instructions.)
2. Push EJECT button to open cassette cover.
3. Carefully push stops of cassette cover located on both sides, as shown in Fig. 2. Then cassette cover can now be removed from cassette deck panel.
4. Remove two cassette deck panel mounting screws, Nos. 24 ~ 25, as shown in Fig. 4.
5. Remove eight (8) knobs from front panel.
6. Remove five (5) bottom board mounting screws, Nos. 1 ~ 5, as shown in Fig. 4.
7. Remove four (4) rear board mounting screws Nos. 6 ~ 8, and remove two (2) cabinet mounting screws, Nos. 22 ~ 23, as shown in Fig. 4.
8. Unsolder faulty components, and replace it with a new one.
9. To reassemble, reverse above procedure.

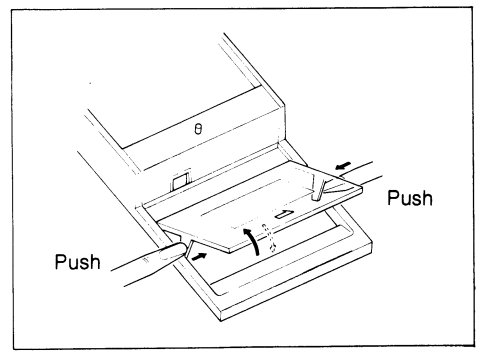


FIG. 2

■ **To Remove Escutcheon from Chassis**

1. Refer to above instructions 1 to 5.
2. Remove three (3) escutcheon mounting screws Nos. 10 ~ 12, as shown in Fig. 4.
3. To reassemble, reverse above procedure.

■ **To Remove Cassette Tape Deck**

1. Refer to instructions 1 to 7 above.
2. Remove six (6) cassette deck mounting screws Nos. 13 ~ 18, as shown in Fig. 4, and remove mike jack.
3. Remove three (3) cassette PC board mounting screws Nos. 19 ~ 21 and remove one (1) REC volume nut.
4. To reassemble, reverse above procedure.

SERVICING AID

■ **Free-Stop Mechanism of Dust Cover**

This models equipped with free-stop mechanism of dust cover. Dust cover can be stopped to be kept open in the free-stop angle range from about 30° to 60°, as shown in Fig. 3. The mechanism has been thoroughly adjusted in best condition at the factory, and under normal use should not be required additional adjustment. However, after prolonged use or hinge(s) replacement, it may be necessary to adjust hinges.

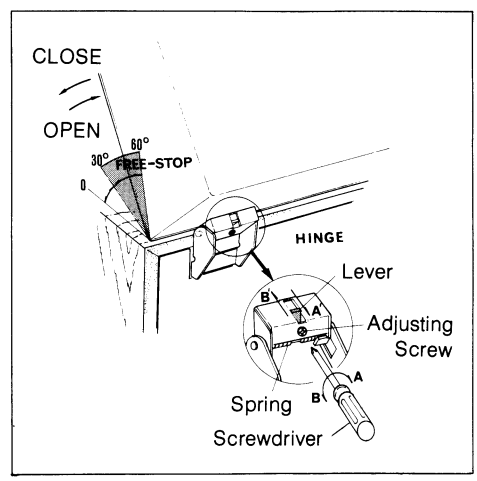
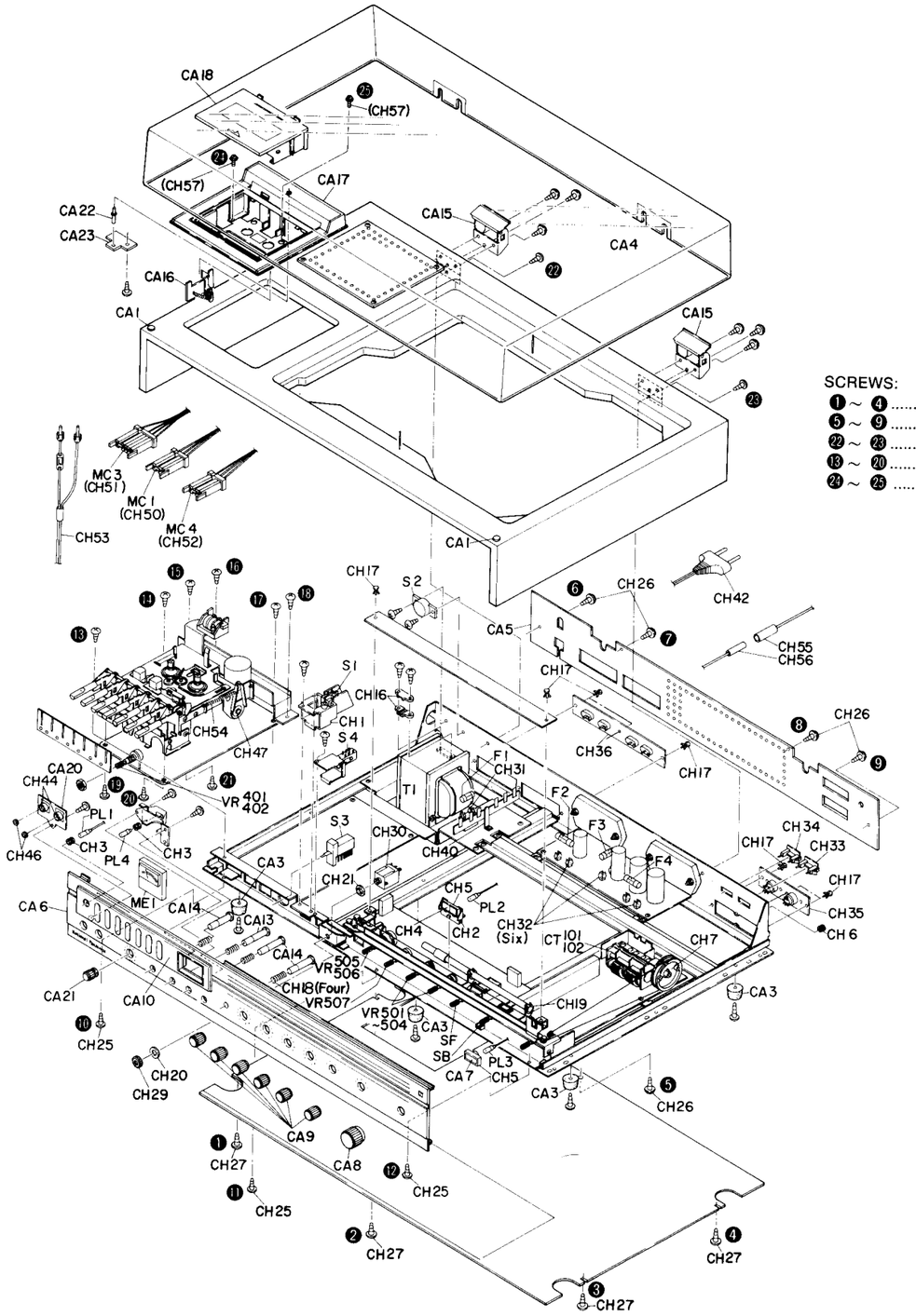


FIG. 3

■ **How to Adjust Hinges**

1. When the screw is turned clockwise (direction A), the lever moves to direction A′ to lessen the spring tension, and opening and closing the dust cover become soft.
2. When the screw is turned counterclockwise (direction B), the lever moves to direction B′ to increase the spring tension, and opening and closing the dust cover become hard.

LOCATION OF PARTS



SCREWS:

- ❶ ~ ❹ CH27
- ❺ ~ ❾ CH26
- ❷❷ ~ ❷❸ CH26
- ❶❾ ~ ❷❵ CH25
- ❷❹ ~ ❷❺ CH57

FIG. 4

EXPLODED VIEW OF CASSETTE TAPE DECK

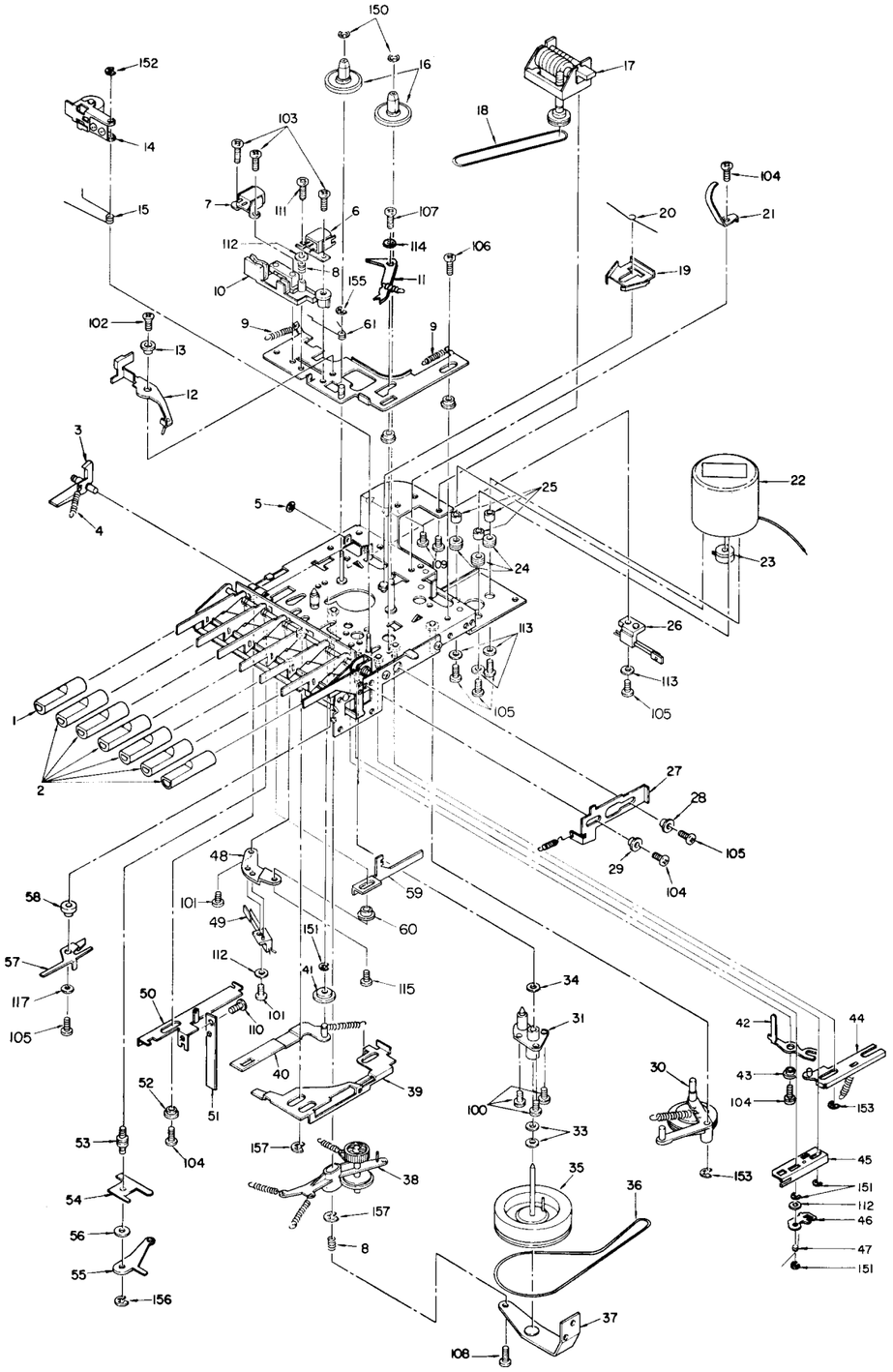
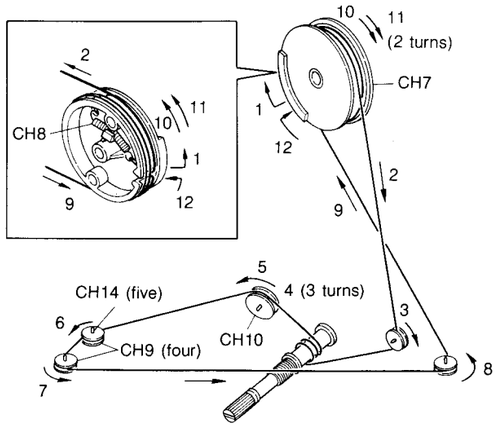


FIG. 5

DIAL CORD STRINGING GUIDE



Tuning Capacitor..... Opened Position
Dial Cord Length..... 165 cm

FIG. 6

ALIGNMENT INSTRUCTIONS (RADIO)—1

AM IFT	
T201 (AM 1st IFT)	455 kHz (UK: 470 kHz)
T203 (AM 3rd IFT).....	455 kHz (UK: 470 kHz)
LW	
L205 (OSC Coil).....	145 kHz
L202 (ANT Coil)	145 kHz
CT205 (OSC Trimmer)	285 kHz
CT202 (ANT Trimmer).....	285 kHz
MW	
L204 (OSC Coil).....	550 kHz
L201 (ANT Coil)	550 kHz
CT204 (OSC Trimmer)	1,500 kHz
CT201 (ANT Trimmer).....	1,500 kHz
SW	
L206 (OSC Coil).....	5.9 MHz
L203 (ANT Coil)	5.9 MHz
CT206 (OSC Trimmer)	18 MHz
CT203 (ANT Trimmer).....	18 MHz
FM IFT	
T101 (FM 1st IFT).....	10.7 MHz
T204 (FM Disc. IFT)	10.7 MHz
T205 (FM Disc. IFT)	10.7 MHz
FM-RF	
L104 (OSC Coil).....	90 MHz
L101 (ANT Coil)	90 MHz
L102 (DET Coil)	90 MHz
CT103 (OSC Trimmer)	106 MHz
CT101 (ANT Trimmer).....	106 MHz
CT102 (DET Trimmer).....	106 MHz
FM STEREO	
T301-1 (MPX Coil), (Pre-aligned)	
VR301 (Separation Control)	

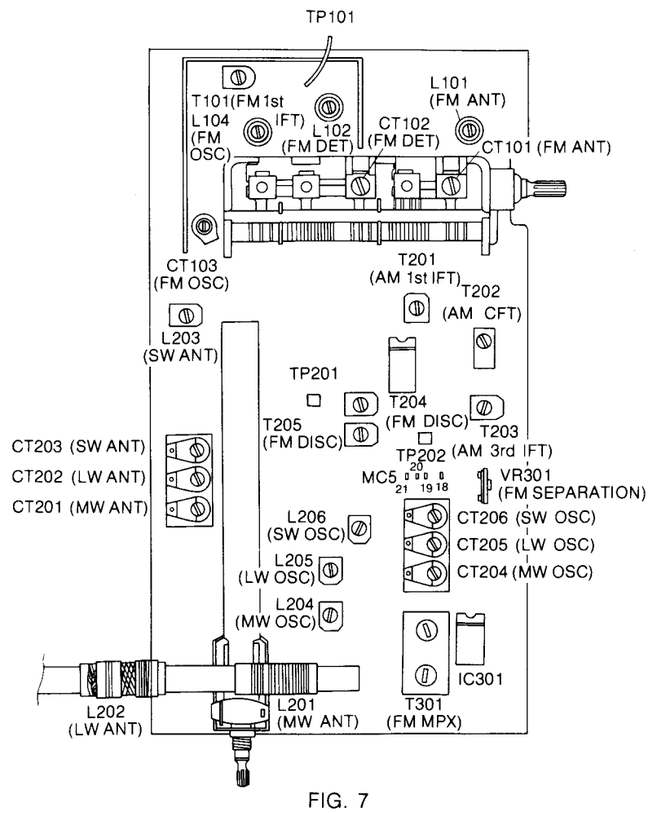


FIG. 7

ALIGNMENT INSTRUCTIONS (RADIO)—2

FREQUENCY AND DISTANCE ON DIAL SCALE
To accurately align to the proper frequencies on the dial scale, refer to Table at right and mark the edge of the dial scale accordingly, using the "Start Point" mark on the dial scale as a reference point.

BAND	FREQUENCY	DISTANCE FROM "START POINT"
LW	145 kHz 285 kHz	16.1 mm 195.0 mm
MW	550 kHz 1500 kHz	22.3 mm 191.2 mm
SW	5.9 MHz 18.0 MHz	8.4 mm 206.2 mm
FM	90 MHz 106 MHz	28.7 mm 179.3 mm

Notes:
1. Volume Control ..... Maximum (AM-IF and RF, FM-RF)
   Minimum (FM-IF)
2. Bass and Treble Control..... Center
3. Balance Control..... Center
4. Band Selector ..... LW, MW, SW, FM MONO, FM AUTO
5. Power Switch ..... ON
6. Tape Monitor..... SOURCE
7. Output of signal generator should be no higher than necessary to obtain output reading.
8. Make certain that speaker system is connected to the tuner when aligning.

STEP	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUST	REMARKS
	CONNECTION	FREQUENCY				
	AM-IF and RF ALIGNMENT					
1	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz (UK: 470 kHz) 30% Mod. with 400 Hz	Point of non-interference (on/about 600 kHz)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	T201 (AM 1st IFT) T203 (AM 3rd IFT)	Adjust for maximum output.
2 (LW)	Fashion loop of several turns of wire and radiate signal into loop of receiver.	145 kHz 30% Mod. with 400 Hz	145 kHz (16.1 mm)	Output meter across speaker Jack (L). (Imp. 4Ω) (UK: 8Ω)	L205 (LW OSC Coil) L202 (LW ANT Coil)	Adjust for maximum output by sliding coil L202 along ferrite core.
3 (LW)	Fashion loop of several turns of wire and radiate signal into loop of receiver.	285 kHz 30% Mod. with 400 Hz	285 kHz (195 mm)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	CT205 (LW OSC Trimmer) CT202 (LW ANT Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).
4 (MW)	Fashion loop of several turns of wire and radiate signal into loop of receiver.	550 kHz 30% Mod. with 400 Hz	550 kHz (22.3 mm)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	L204 (MW OSC Coil) L201 (MW ANT Coil)	Adjust for maximum output by sliding coil L201 along ferrite core.
5 (MW)	Fashion loop of several turns of wire and radiate signal into loop of receiver.	1500 Hz 30% Mod. with 400 Hz	1500 kHz (191.2 mm)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	CT204 (MW OSC Trimmer) CT201 (MW ANT Trimmer)	Adjust for maximum output. Repeat steps (4) and (5).
6 (SW)	Connect to EXT antenna and ground through SW Dummy antenna. (Refer to Fig. 10)	5.9 MHz 30% Mod. with 400 Hz	5.9 MHz (8.4 mm)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	L206 (SW OSC Coil) L203 (SW ANT Coil)	Adjust for maximum output by sliding coil L203 along ferrite core.
7 (SW)	Connect to EXT antenna and ground through SW Dummy antenna. (Refer to Fig. 10)	18 MHz 30% Mod. with 400 Hz	18 MHz (206.2 mm)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	CT206 (SW OSC Trimmer) CT203 (SW ANT Trimmer)	Adjust for maximum output. Repeat steps (6) and (7).

Note: T202 is pre-aligned. Do not touch it.

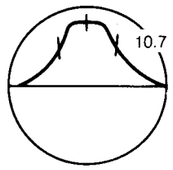


FIG. 8

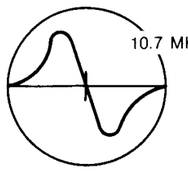


FIG. 9

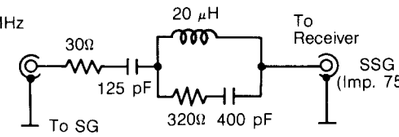


FIG. 10

FIG. 11 DUMMY ANTENNA

SCHEMATIC DIAGRAM OF I

FM ANT

AM ANT

FM RF AMP
TR101 2SK49

FM OSC
TR102 2SC1675

FM MIXER
TR103 2SC1675

AM CONV
TR201 2SC1359

FM.AM IF AMP
IC201 AN217

FM MPX
IC301 AN271

TUNING
TR202 2SC828

STABI

FM AFC
D103 SC-15

FM AGC
D101.102 0A90

AM D.AGC
D201 0A90

FM DET
D202.203 20A90

AM DET
D204 0A90

AM RECT
D205 0A90

AOC
D206 VD1121

D902

DIAL POINT

TUNIN METE LAMI

PHONO L

PHONO R

REFER TO Fig.3. Fig.4

Fig. 3

Fig. 4
(Norway ONLY)

MIKE Lch

REC/PLAY HEAD Lch

MIKE Rch

REC/PLAY HEAD Rch

ERASE HEAD

REC LEVEL TUNING METER

STEREO EYE

PL4

Normal
( )CrO2

AOC
D803
VD1121

RECT
D801,802
0A90

TAPE EQUALIZER AMP
TR401.402 2SC1327
TR403.404 2SC1327

STABILIZER
D804
0Z9.5A

REC AMP
TR405,406,407,408
2SC828

REC LEVEL METER AMP
TR801,802
2SC828

BIAS AMP
TR803
2SB324

BIAS OSC
TR804
2SB175

| | | |

GRAM OF MODEL SG-2070L

TUNING
TR202 2SC828

AOC
s VD1121

STABILIZER
D902 02Z9.5A

RIPPLE FILTER
TR901 2SC1383

RECT
D901 S1RB10
D903,D904 10DC1R
D905,D906 10DC1

UK only
BROWN
BLUE
YELLOW/GREEN

FM LINE ANT

IC201

NO	FM (V)	AM (V)
1	+ 0.80	+ 0.80
2	0	0
3	+ 2.82	+ 2.87
4	+ 6.50	+ 6.63
5	+ 1.08	+ 1.07
6	0	0
7	+ 1.08	+ 1.07
8	+ 7.90	+ 7.95
9	+ 0.89	+ 7.94
10	+ 1.08	+ 1.45
11	+ 0.79	+ 0.79
12	+ 0.89	+ 7.89
13	+ 0.56	+ 0.72
14	+ 0.88	+ 1.46
15	+ 0.89	+ 7.94
16	+ 0.56	+ 0.72

IC301

NO	FM STEREO(V)
1	+ 2.17
2	+ 7.84
3	+ 7.83
4	+ 7.86
5	+ 2.23
6	+ 2.20
7	+ 5.48
8	+ 5.45
9	+ 1.50
10	+ 0.87
11	0
12	+ 1.17
13	+ 0.91
14	0
15	+ 0.91
16	+ 6.81

IC701, 702

NO	(V)
1	-20.8
2	0
3	+ 20.8
4	+ 11.0
5	—
6	—
7	+ 0.085
8	+ 0.1
9	0
0	—

DIAL POINTER
TUNING METER LAMP
PL2
PL4
PHONO
AUX
PLAY/REC
MC2
MC3
MC4
SF1
SF2
S3 TAPE MONITOR
S8
S9
THERMAL FUSE
REFER TO Fig,2

POWER AMP IC701 STK 022
POWER AMP IC702 STK 022

PHONO AMP
TR501,502,503,504
2SC1327

AF AMP
TR505,506,507,508
2SC900

NOTES
1) S1 : POWER SWITCH IN "OFF" POSITION
S2 : POWER VOLTAGE SELECTOR IN "240V" POSITION
(P:COMMON 1:110V 2:120V 3:220V 4:240V)
S3 : TAPE MONITOR SWITCH IN "SOURCE" POSITION
S4 SPKR SELECTOR SWITCH IN SPKR "A" POSITION (EXCEPT UK)
(FOR UK, MODE SWITCH IN "STEREO" POSITION
S5 : TAPE SELECTOR SWITCH IN "NORMAL" POSITION
S6 : TAPE MOTOR SWITCH IN "OFF" POSITION
S7 : TAPE AMP SWITCH IN "OFF" POSITION
SF1~6 : FUNCTION SELECTOR SWITCH IN "RADIO" POSITION
(1:COMMON 2:PHONO 3:RADIO 4:TAPE 5:AUX)
SB1~12 : BAND SELECTOR SWITCH IN "FM MONO" POSITION
(1:COMMON 2:FM MONO 3:FM AUTO 4:MW 5:LW 6:SW)
ST1~12 : REC SWITCH IN "PLAY" POSITION
S8 : PHONO MOTOR SWITCH IN "OFF" POSITION
S9 : 33-45RPM SELECTOR IN "33" POSITION

2) Letters M,P,K,J indicate forelance of capacitors as follows
M=±20% P=+100 −0% K=±10% J=±5%
3) DC Voltages are to be measured with VTVM under no signal condition in "AM" "FM" position.

Fig, 2

S4-2 S4-1 SPKR-A Lch SPKR-B Lch SPKR-A Rch SPKR-B Rch
S4-2 S4-1 FRONT Lch REAR Lch FRONT Rch REAR Rch
R3 6,8 10W
UK ONLY

S1 S2 S3,S4 SF5 SF3 SF1 SB11 SB9 SB7 SB5 SB3 SB1 SF6 SF4 SF2 SB12 SB10 SB8 SB6 SB4 SB2
(BOTTOM VIEW)

PHONES
1 No Color
2 Red
3 Green
4 Black
5 Blue
6 Red
7 Green
8 No Color
9 Blue
10 Black

(BOTTOM VIEW)
L403,404 T801 T202 T301
L101 L102,103 L104
L202 (Norway only) T204 T101.201,203.205, L203,204.205.206,

D206,803 D103 D903,904 D905,906 D101.102.201.214.205 D202 203 801.802.804.902

D901 (BOTTOM VIEW)

PHONES (BOTTOM VIEW)

IC201,301 (TOP VIEW)

STK022 POWER AMPLIFIER
IC 701, 702 (TOP VIEW)

TR803,804 TR101 TR102.103.201.202.401.402.403 404.405.406.407.408.501.502 503.504.505.506.507.508.801 802.901

SCHEMATIC DIAGRAM
SG-2070L

| | | |

WIRING DIAGRAM OF MO

TR101	
D	6.73V
G	−10.4mV
S	0
Id	3.7mA

TR102	
C	2.83V
B	1.64V
E	1.0V
Ic	1mA

TR103	
C	7.44V
B	0.71V
E	0.03V
Ic	2.9mA

TR201	
C	7.94V
B	2.46V
E	1.83V
Ic	0.6mA

TR202	
C	8V
B	0.48V
E	0.97mV
Ic	—

TR901	
C	13.6V
B	9.27V
E	8.63V
Ic	5.1mA

TR501, 502	
C	1.13V
B	0.57V
E	0.04V
Ic	85μA

TR503, 504	
C	5.17V
B	1.13V
E	0.58V
Ic	0.26mA

TR505,	
C	3.
B	1.
E	1.
Ic	1

IC701, 702

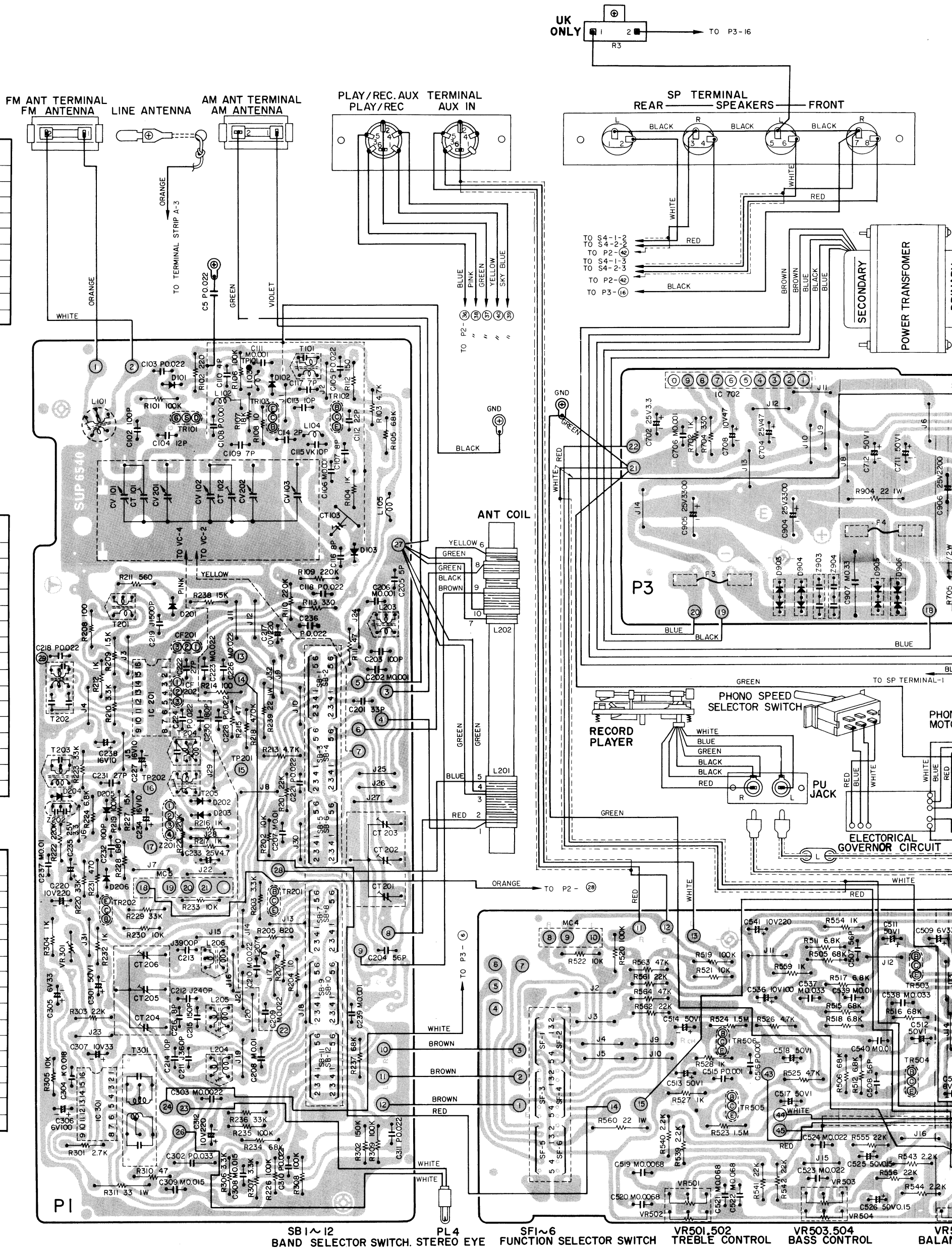
PIN. NO.	(V)
1	−20.8
2	0
3	20.8
4	11.0
5	—
6	—
7	0.085
8	0.1
9	0
0	—

IC201

PIN. NO.	FM (V)	AM (V)
1	0.80	0.80
2	0	0
3	2.82	2.87
4	6.50	6.63
5	1.08	1.07
6	0	0
7	1.08	1.07
8	7.90	7.95
9	0.89	7.94
10	1.08	1.45
11	0.79	0.79
12	0.89	7.89
13	0.56	0.72
14	0.88	1.46
15	0.89	7.94
16	0.56	0.72

IC301

PIN. NO.	FM STEREO (V)
1	2.17
2	7.84
3	7.83
4	7.86
5	2.23
6	2.20
7	5.48
8	5.45
9	1.50
10	0.87
11	0
12	1.17
13	0.91
14	0
15	0.91
16	6.81



* This diagram might be modified without notice for further developement of technology.

AM OF MODEL SG-2070L

3, 504	
	5.17V
	1.13V
	0.58V
	0.26mA

TR505, 506	
C	3.58V
B	1.66V
E	1.07V
Ic	1mA

TR507, 508	
C	2.89V
B	0.86V
E	0.26V
Ic	1.2mA

TR401, 402	
C	1.14V
B	0.53V
E	5.65mV
Ic	0.06mA

TR403, 404	
C	2.45V
B	1.14V
E	0.54V
Ic	1.15mA

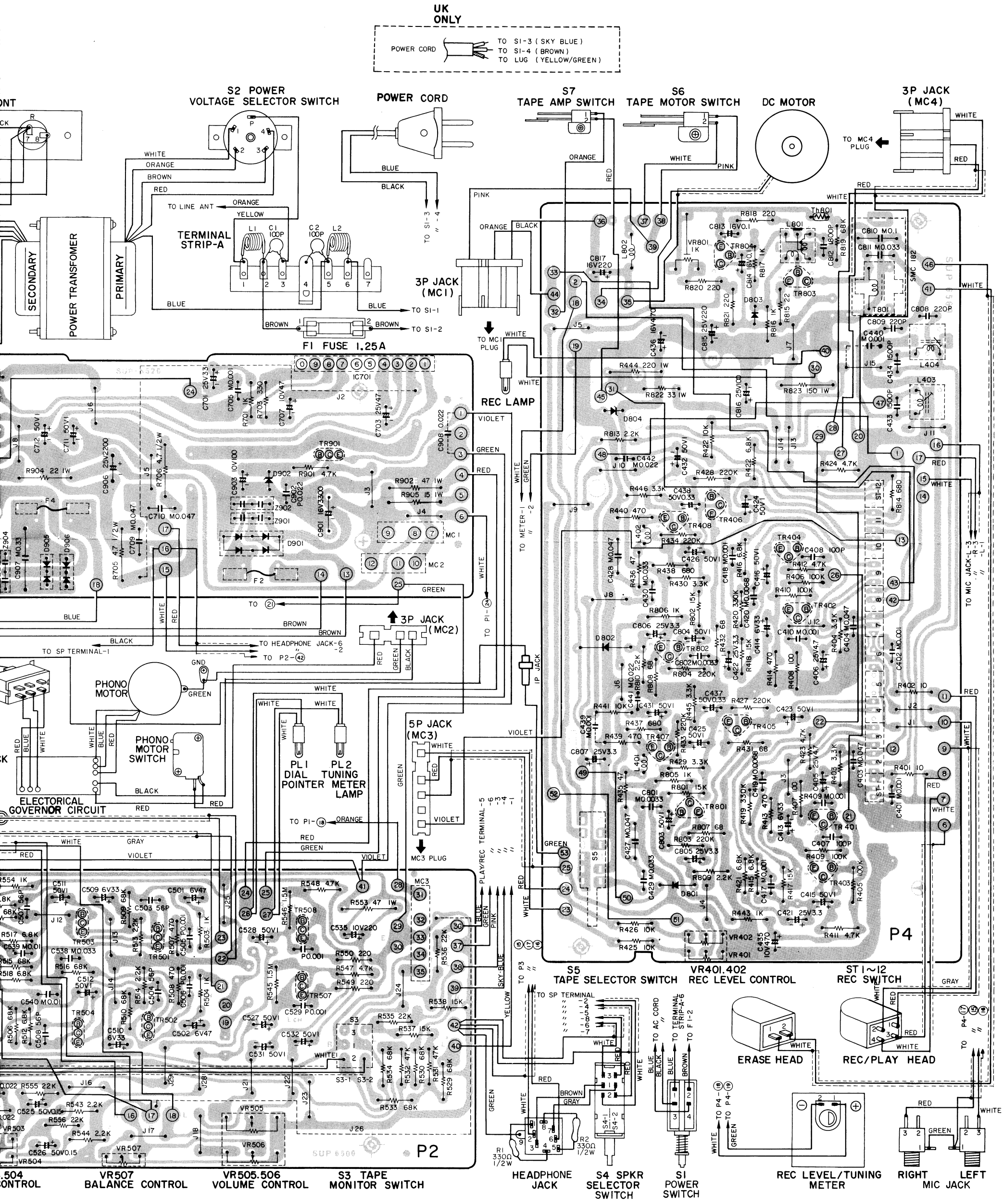
TR405, 406	
C	2.64V
B	0.81V
E	0.15V
Ic	2.23mA

TR407, 408	
C	6.65V
B	3.0V
E	2.35V
Ic	5.0mA

TR801, 802	
C	4.96V
B	1.02V
E	0.34V
Ic	5.0mA

TR804	
C	47mV
B	15.0V
E	14.8V
Ic	1.14mA

TR803	
C	0.67V
B	14.9V
E	15.0V
Ic	32.0mA



ALIGNMENT INSTRUCTIONS (RADIO)—3

STEP	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUST	REMARKS
	CONNECTION	FREQUENCY				
	FM-IF and DETECTOR ALIGNMENT					
1	High side through 0.001 mfd to point TP101. Common to chassis.	10.7 MHz (400 kHz SWP.)	Point of non-interference (on/ about 98 MHz)	Connect vert amp. of scope to point TP201. Common to chassis. (TP202)	T101 (FM 1st IFT) T204 (FM Disc. IFT)	Adjust for maximum amplitude and symmertrical curve (Refer to Fig. 8)
2	High side through 0.001 mfd to point TP101. Common to chassis.	10.7 MHz (400 kHz SWP).	Point of non-interference (on/ about 98 MHz)	Connect vert. amp. of scope to point TP201. Common to chassis. (TP202)	T205 (FM Disc. IFT)	Adjust for maximum amplitude and proper linearity between ±100 kHz markers. (Refer to Fig. 9)
*** Before aligning step 1, turn the core of T205 fully counterclockwise.**						
	FM-RF ALIGNMENT					
1	Connect to EXT. FM antenna terminal through Dummy antenna. Common to chassis. (Refer to Fig. 11)	90 MHz 30% Mod. with 400 Hz	90 MHz (28.7 mm)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	L104 (FM OSC Coil) L101 (FM ANT Coil) L102 (FM DET Coil)	Adjust for maximum output.
2	Connect to EXT. FM antenna terminal through Dummy antenna. Common to chassis. (Refer to Fig. 11)	106 MHz 30% Mod. with 400 Hz	106 MHz (179.3 mm)	Output meter across speaker jack (L). (Imp. 4 Ω) (UK: 8Ω)	CT103 (FM OSC Trimmer) CT101 (FM ANT Trimmer) CT102 (FM DET Trimmer)	Adjust for maximum output. Repeat steps (1) and (2).
*** As three output readings will be present, adjustments must be made at center frequency.** *** To correct drift at the FM dial scale (87.5 or 108 MHz), adjust coil L104 and trimmer CT103 with each other.**						

FM STEREO ALIGNMENT

Notes:
1. Stereo Modulator: Connect Stereo Modulator to EXT. Mod. terminal of signal generator
2. Signal Generator: Modulation Rate of 19 kHz Pilot Signal 10%
   Output Level ..... 30 dB
   Frequency ..... Approx. 98 MHz
3. Tuner: Volume Control ..... Audible level of speaker sound
   Treble and bass Control ..... MIN
   Band Selector ..... FM
   Balance Control ..... Center
   Band Selector ..... FM AUTO

19 kHz AMP. ALIGNMENT

EQUIPMENT CONNECTION		ADJUST	REMARKS
SIGNAL GENERATOR	OSCILLOSCOPE		
Connect to EXT. FM antenna terminal through dummy antenna. (Refer to Fig. 11)	–	(T301)	Pre-aligned. Do not touch it.

SEPARATION ALIGNMENT

Notes:
1. Signal Generator: Modulation Rate of 19 kHz Pilot Signal 10%
   Modulation Rate of Right and Left Signal 27%
   Output Level ..... 60 dB
2. Tuner (Balance Control): Adjust balance control level so that output level from both channels becomes equal.
3. Treble and Bass Control ..... MIN

EQUIPMENT CONNECTION			ADJUST	REMARKS
SIGNAL GENERATOR	VTVM	OSCILLOSCOPE		
Connect to EXT. FM antenna terminal through dummy antenna. (Refer to Fig. 11)	Connect across speaker jack. (left side) (Imp. 4 Ω) (UK: 8Ω)	Connect vertical amp. input of scope to terminals of VTVM.	VR301 (Separation Control)	Adjust VR301 for minimum indication on VTVM from the left side output when the right side of stereo modulator is modulated. Adjust VR301 in the same way for the right side. Adjust for best balance between "L to R" and "R to L" separation.

ALIGNMENT INSTRUCTIONS (RADIO)—4

Notes:
1. Function Selector ..... TAPE
2. Balance Control ..... Center
3. Depress push buttons PLAY and REC at the same time. (Be sure to release the record safety lever manually.)
4. Tape Selector ..... CrO_2

STEP	CIRCUITS	VTVM CONNECTION	VOLUME CONTROL	ADJUSTMENT	REMARKS
1	AC BIAS OSCILLATOR and ERASE	Connect positive side to TP405 (+) and negative side to TP406 (−). (Refer to Fig. 12)	MIN.	L801 VR801 (Voltage Control)	Adjust L801 for maximum output. Asjust VR801 for 8.5 ±0.2 V reading on VTVM-1.
2	AC BIAS OSCILLATOR and ERASE	Connect positive side to TP401 and negative side to TP403 (Refer to Fig. 12)	MIN.	L403 (AC Bias Trap Coil)	Adjust L403 for 4.1 ±0.2 V reading on VTVM-1.
3	AC BIAS OSCILLATOR and ERASE	Connect positive side to TP402 and negative side to TP404 (Refer to Fig. 12)	MIN.	L404 (AC Bias Trap Coil)	Adjust L404 for 4.1 ±0.2 V reading on VTVM-2. Repeat steps (2) and (3).

Notes:
1. Do not touch R/P Head and Erase Head when adjusting.
2. As two points are obtainable when adjusting the L403 and L404, turn cores down clockwise before making adjustments.

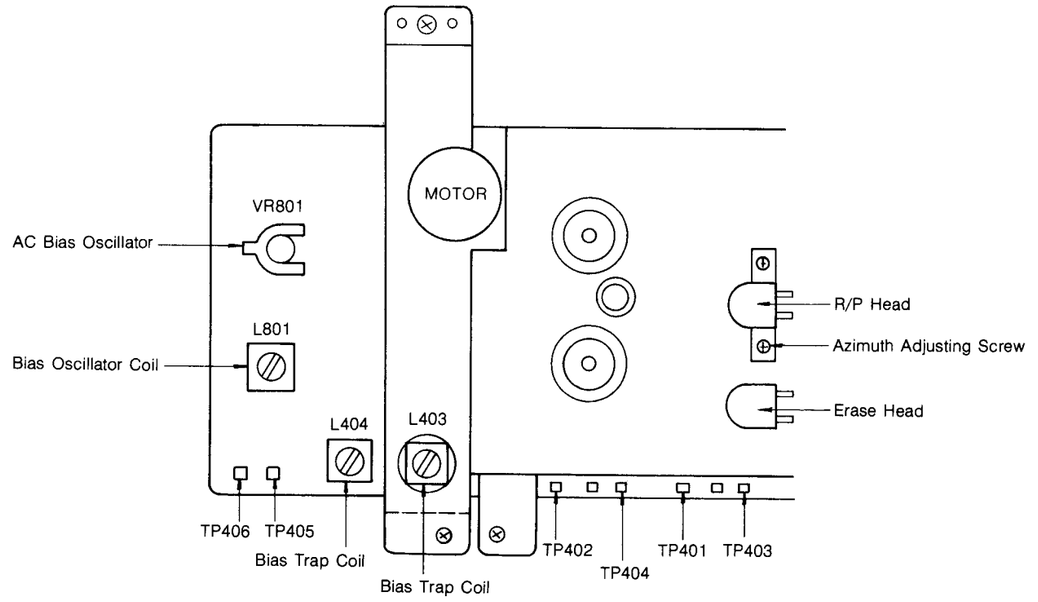


FIG. 12

RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT

Playback a Standard Alignment Tape and turn Azimuth Adjusting Screw for maximum loudness.

*** Test Tape (6.3 kHz)**
VTT-652 or Equivalent

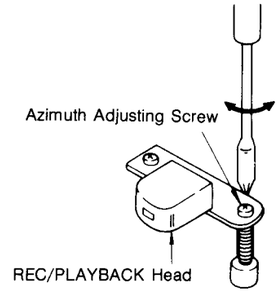


FIG. 13

MECHANICAL ADJUSTMENT OF TAPE DECK

PRESSURE ROLLER ADJUSTMENT

1. Switch set to PLAY. (Do not insert cassette.)
2. Hook Spring gauge to arm pressure rollers, as shown in Fig. 14.
3. Pull pressure roller away from the capstan in the direction of arrow 1 with spring gauge and slowly permit the pressure roller to return forward capstan in the direction of arrow 2.
4. Measure tension at time when pressure roller makes contact with capstan (or when pressure roller starts rotating.)
5. The standard tension of pressure roller should be 250 ~ 380 g.
6. If pressure is not within these limits;
   Clean the rubber roller and capstan with a soft cloth moistened with alcohol or replace pressure spring.

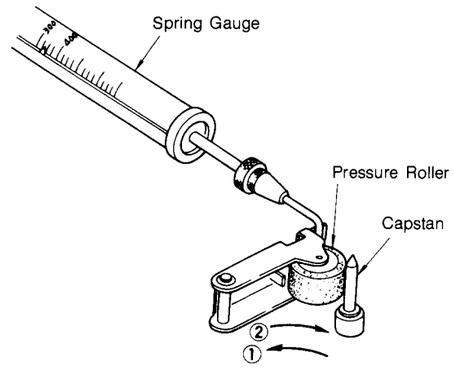


FIG. 14

TAKE-UP TORQUE ADJUSTMENT

* Test Tape: SRK-CT (Take-up Torque Meter)

1. Insert test tape.
2. Rewind the tape to its starting point.
3. Switch set to PLAY.
4. Read "▶" mark of indicator on take-up side, as shown in Fig. 15.
5. Repeat PLAY-STOP several times and read the average tension.
6. The standard take-up tension should be 30 ~ 70 g.cm.
   If take-up tension is not within these limits;
   a) Clean main belt, take-up reel and all parts which contact them with a cotton swab moistened with alcohol, and/or
   b) Switch set to "OFF", remove main belt and make sure that take-up reel and take-up clutch are rotating smoothly.
   c) Change take-up clutch tension by turning the friction spring under reel table, as shown in Fig. 16, and/or
   d) Replace take-up clutch.

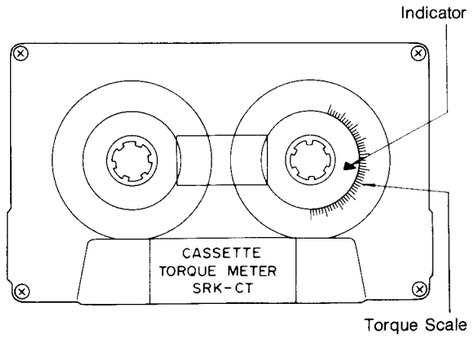


FIG. 15

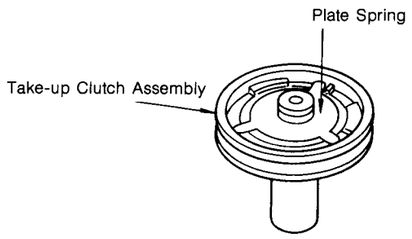


FIG. 16

EXPLODED VIEW OF RECORD PLAYER

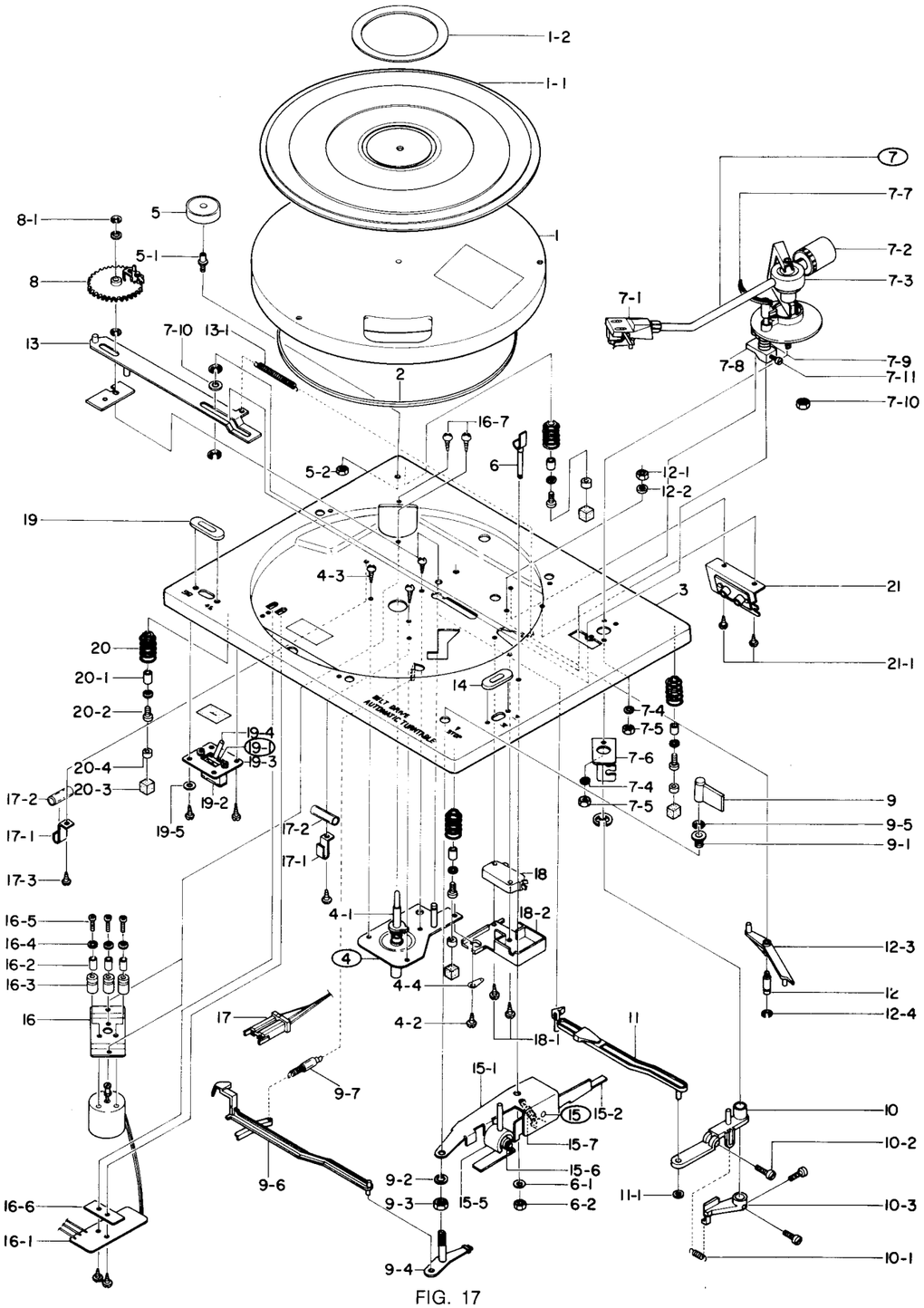


FIG. 17

SERVICING THE RECORD PLAYER

CARTRIDGE REPLACEMENT

1. Remove the headshell fixing nut by turning it clockwise and remove headshell from pickup arm.
2. Remove cartridge from headshell by removing the two screws and disconnecting the lead wires from cartridge, as shown in Fig. 18.
3. Using the two nuts attached, mount a new cartridge onto headshell so that the cartridge is perpendicular to the disc surface.

   Note:
   Correct stylus position can be obtained by relocating the cartridge, as shown in Fig. 19.
4. Connect the lead wires of identical colors as shown in Fig. 20.
5. Install headshell to pickup arm.

STYLUS REPLACEMENT

1. Lift pickup arm to a position that will make the stylus accessible.
2. Gently remove worn stylus and replace it with a new one, as shown in Fig. 21.

LUBRICATION

The record player has been thoroughly lubricated at the factory and under normal use should not require additional lubrication. When replacing some parts, however, it may be necessary to lubricate the parts as specified.
(Apply grease to Ⓖ as shown in Figs. 22 and 23.)

Note:
Do not allow grease to touch motor pulley, belt and turntable.

STYLUS PRESSURE ADJUSTMENT

1. Release pickup arm from its seated position. Place a record on the turntable. Then, balance the pickup arm by turning in or out the balance weight until the stylus is leveled to the surface of the record (as viewed from the turntable unit side).
2. Set the stylus pressure dial to "0", and since the specified stylus pressure of the cartridge is 2.0 grams, set the balance weight dial to "2" by turning the weight counterclockwise (as viewed from the front panel side.).

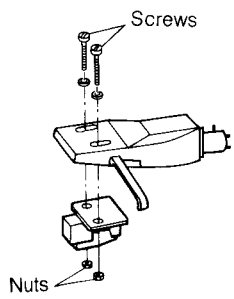


FIG. 18

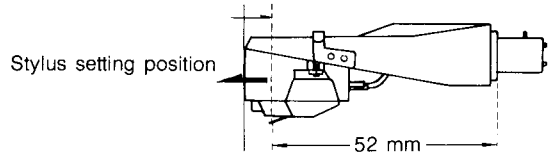


FIG. 19

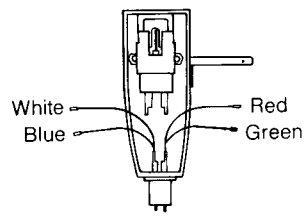


FIG. 20

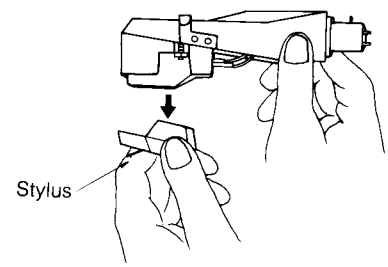


FIG. 21

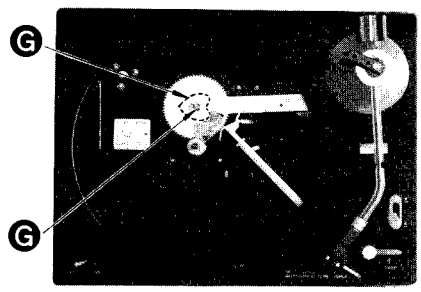


FIG. 22

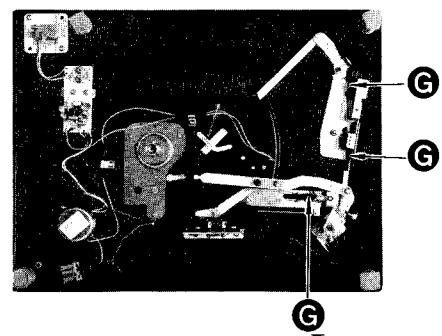


FIG. 23

REPLACEMENT PARTS LIST

NOTES: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. SAFETY indicates that only parts specified by the manufacturer be used for replacement in critical circuits.
3. X ~ Z rank.
X rank parts will cover 80% of repair needs.
X + Y rank parts will cover 95% of repair needs.
Z rank parts are less necessary.

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
TRANSISTORS				
TR101	2SK49	FM RF Amplifier	1	X
TR102,103	2SC1675-L	FM Oscillator, FM Mixer	2	X
TR201	2SC1359	AM Converter	1	X
TR202	2SC828	Tuning	1	X
TR501 ~ 504	2SC1327	Phono Amplifier	4	X
TR505 ~ 508	2SC900	AF Amplifier	4	X
TR901	2SC1383	Ripple Filter	1	X
TR401,402, 403,404	2SC1327	Equlizer Pre-amplifier	4	X
TR405 ~ 408,801, 802	2SC828	Recording Amplifier, Meter Amplifier	6	X
TR804	2SB175	Bias Oscillator	1	X
TR803	2SB324	Oscillator Amplifier	1	X
INTEGRATED CIRCUITS				
IC201	AN217	FM and AM IF Amplifier	1	X
IC301	AN271	FM MPX Amplifier	1	X
IC701,702	STK022	Power Amplifier	2	X
DIODES				
D103	SC15	FM AFC	1	X
D202,203	2-OA90	FM Detector	2	X
D101,102 201,204, 205,801, 802	OA90	FM AGC, AM D. AGC, AM Detector, Rectifier	7	X
D206,803	VD1121	AOC	2	X
D901	S1RB10	Rectifier	1	X
D902,804	02Z9.5A	Stabilizer	2	X
D903,904	10DC1R	Rectifier	2	X
D905,906	10DC1	Rectifier	2	X
THERMISTOR				
TH801	RRT103	Temperature Compensator	1	X
INDICATOR				
ME1	SSM46	Signal and Level Meter	1	X
LAMPS AND FUSES				
PL1,2,4	XAMR52X300	REC Lamp, Dial Pointer and Meter SAFETY	1	
PL3	XAMR34X500-1	Stereo Eye 14V 60mA SAFETY	1	
F1	XBAS2A1004	Fuse 1.25A (Primary) SAFETY	1	
F2	XBAS2A1201	Fuse 1A (Third) SAFETY	1	
F3,4	XBA2C31TR0	Fuse 3.15A (Secondary) SAFETY	2	
COILS AND TRANSFORMERS				
L101	SLA4N2-O	FM Antenna Coil	1	X
L102	RLD4N30	FM Collector Coil	1	X
L103	RLQY30S1-O	FM IF Trap Coil	1	Y
L104	SLO4N12-O	FM Oscillator Coil	1	X
L105	SLQX250-1	RFC	1	Y
L201,202	SLF6G16-O	MW and LW Ferrite Antenna Coil	1	X
L203	SLA3M2	SW Antenna Coil	1	X
L204	SLO2M2-M	MW Oscillator Coil	1	X
L205	SLO1M2	LW Oscillator Coil	1	X
L206	RLO3M14	SW Oscillator Coil	1	X
L207	RLQY25S-5	RFC	1	Y
L1,2	SLQY35S-4X	RFC	2	Y
T101	RLI4M101	FM 1st IFT	1	X
T201	SLI2M102	AM 1st IFT	1	X
T202	RLI7W105R-T	AM CFT (RLI7W108P-T ..... UK only)	1	X
T203	RLI2M402	AM 2nd IFT	1	X
T204	RLI4M501-M	FM Disc. IFT	1	X
T205	RLI4M502-M	FM Disc. IFT	1	X
T301	RLM1Z3Q-K	FM MPX Coil	1	X
CF201,202	RVFCF10M12CR	FM CFT	2	X
T1	SLT5N28-W	Power Transformer SAFETY	1	○ X
L401,402	SLQU222-2Y	Choke Coil	2	Y
L403,404	RLQC542-T	Bias Trap Coil	2	X
L801	SLO9Z10-T	Bias Oscillator Coil	1	X
L802	ELQ250A999	Choke Coil	1	Y
T801	SLT6E2-D	Choke Transformer	1	X
COMPONENT COMBINATIONS				
Z201	EXA5DL04C	330pf (three), 4.7kΩ (two), FM	1	Y
Z202	EXAF203Z471	0.02mf (two), 470Ω, AM	1	Y
Z901 ~ 904	EXN2SL04C	0.01mf (two)	1	Y
RESISTORS (RF Circuit)				
R108,204	ERD18TJ100	10Ω 1/8W ±5% Carbon	2	Z
R111,207, 215,310	ERD18TJ470	47Ω 1/8W ±5% Carbon	4	Z
R208,214	ERD18TJ101	100Ω 1/8W ±5% Carbon	2	Z
R112	ERD18TJ151	150Ω 1/8W ±5% Carbon	1	Z
R102	ERD18TJ221	220Ω 1/8W ±5% Carbon	1	Z
R113	ERD18TJ331	330Ω 1/8W ±5% Carbon	1	Z
R231	ERD18TJ471	470Ω 1/8W ±5% Carbon	1	Z
R228	ERD18TJ681	680Ω 1/8W ±5% Carbon	1	Z
R205	ERD18TJ821	820Ω 1/8W ±5% Carbon	1	Z
R104,232, 212,216, 217,304	ERD18TJ102	1kΩ 1/8W ±5% Carbon	6	Z
R209	ERD18TJ152	1.5kΩ 1/8W ±5% Carbon	1	Z
R210,203, 306,307	ERD18TJ332	3.3kΩ 1/8W ±5% Carbon	4	Z
R103,213	ERD18TJ472	4.7kΩ 1/8W ±5% Carbon	2	Z
R224	ERD18TJ682	6.8kΩ 1/8W ±5% Carbon	1	Z
R230,305, 202,233	ERD18TJ103	10kΩ 1/8W ±5% Carbon	4	Z
R227,238	ERD18TJ153	15kΩ 1/8W ±5% Carbon	2	Z
R201,303	ERD18TJ223	22kΩ 1/8W ±5% Carbon	2	Z
R220,223, 229,236	ERD18TJ333	33kΩ 1/8W ±5% Carbon	4	Z
R105,234, 237	ERD18TJ683	68kΩ 1/8W ±5% Carbon	3	Z
R101,106, 219,226, 235,308, 309	ERD18TJ104	100kΩ 1/8W ±5% Carbon	7	Z
R302	ERD18TJ154	150kΩ 1/8W ±5% Carbon	1	Z
R109,110, 222,221	ERD18TJ224	220kΩ 1/8W ±5% Carbon	4	Z
R218	ERD18TJ474	470kΩ 1/8W ±5% Carbon	1	Z
R211	ERD18TJ561	560Ω 1/8W ±5% Carbon	1	Z
R301	ERD18TJ272	2.7kΩ 1/8W ±5% Carbon	1	Z
R107	ERD18TJ183	18kΩ 1/8W ±5% Carbon	1	Z
R311	ERG1ANJ330	33Ω 1W ±5% Metal Film SAFETY	1	Z
R239	ERG1ANJ220	22Ω 1W ±5% Metal Film SAFETY	1	Z

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
		(Control Amplifier Circuit)		
R549,550	ERD18TJ221	220Ω 1/8W ±5% Carbon	2	Z
R507,508	ERD18TJ471	470Ω 1/8W ±5% Carbon	2	Z
R503,504, 527,528, 554,559	ERD18TJ102	1kΩ 1/8W ±5% Carbon	6	Z
R513,514, 539,540, 543,544	ERD18TJ222	2.2kΩ 1/8W ±5% Carbon	6	Z
R525,526, 547,548	ERD18TJ472	4.7kΩ 1/8W ±5% Carbon	4	Z
R511,512, 517,518	ERD18TJ682	6.8kΩ 1/8W ±5% Carbon	4	Z
R521,522	ERD18TJ103	10kΩ 1/8W ±5% Carbon	2	Z
R535,536 537,538	ERD18TJ153	15kΩ 1/8W ±5% Carbon	2	Z
541,542, 555,556, 561,562	ERD18TJ223	22kΩ 1/8W ±5% Carbon	8	Z
R531,532 563,564	ERD18TJ473	47kΩ 1/8W ±5% Carbon	4	Z
R505,506, 509,510, 515,516, 529,530, 533,534	ERD18TJ683	68kΩ 1/8W ±5% Carbon	10	Z
R519,520	ERD18TJ104	100kΩ 1/8W ±5% Carbon	2	Z
R523,524, 545,546	ERD18TJ155	1.5MΩ 1/8W ±5% Carbon	4	Z
R553	ERG1ANJ470	47Ω 1W ±5% Metal Film SAFETY	1	Z
R560	ERG1ANJ220	22Ω 1W ±5% Metal Film SAFETY	1	Z
		(Power Amplifier Circuit)		
R902,904	ERG1ANJ470	47Ω 1W ±5% Metal Film SAFETY	1	Z
R703,704	ERD18TJ331	330Ω 1/8W ±5% Carbon	2	Z
R701,702	ERD18TJ102	1kΩ 1/8W ±5% Carbon	2	Z
R901	ERD18TJ472	4.7kΩ 1/8W ±5% Carbon	1	Z
R705,706	ERD12TJ4R7	4.7Ω 1/2W ±5% Carbon	2	Z
		(Cassette Circuit)		
R401,402	ERD18TJ100	10Ω 1/8W ±5% Carbon	2	X
R815	ERD18TJ220	22Ω 1/8W ±5% Carbon	1	X
R435,436	ERD18TJ470	47Ω 1/8W ±5% Carbon	2	X
R431,432, 807,808	ERD18TJ680	68Ω 1/8W ±5% Carbon	4	X
R407,408	ERD18TJ101	100Ω 1/8W ±5% Carbon	2	X
R820,821, 818	ERD18TJ221	220Ω 1/8W ±5% Carbon	3	X
R413,414, 439,440	ERD18TJ471	470Ω 1/8W ±5% Carbon	4	X
R814,437, 438	ERD18TJ681	680Ω 1/8W ±5% Carbon	3	X
R816,187, 805,806, 443	ERD18TJ102	1kΩ 1/8W ±5% Carbon	5	X
R809,810, 813	ERD18TJ222	2.2kΩ 1/8W ±5% Carbon	3	X
R429,430, 403,404, 445,446	ERD18TJ332	3.3kΩ 1/8W ±5% Carbon	6	X
R411,412, 423,424	ERD18TJ472	4.7kΩ 1/8W ±5% Carbon	4	X
R415,416, 421,422	ERD18TJ682	6.8kΩ 1/8W ±5% Carbon	4	X
R441,442, 425,426	ERD18TJ103	10kΩ 1/8W ±5% Carbon	4	X
R417,418, 801,802	ERD18TJ153	15kΩ 1/8W ±5% Carbon	4	X
R405,406, 409,410	ERD18TJ104	100kΩ 1/8W ±5% Carbon	4	X
R427,428, 433,434, 803,804	ERD18TJ224	220kΩ 1/8W ±5% Carbon	6	X
R419,420	ERD18TJ334	330kΩ 1/8W ±5% Carbon	2	X
R819	ERD18TJ683	68kΩ 1/8W ±5% Carbon	1	X

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
R823	ERG1ANJ151	150Ω 1W ±5% Metal Film SAFETY	1	X
R444	ERG1ANJ221	220Ω 1W ±5% Metal Film SAFETY	1	X
R822	ERG1ANJ330	33Ω 1W ±5% Metal Film SAFETY	1	X
		(Others)		
R1,2	ERD12TJ331	330Ω 1/2W ±5% Carbon	2	Z
R3	ERF10HMK6R8F	6.8Ω 10W ±10% Wire Wound (UK only) SAFETY	1	Z
		CAPACITOR (RF Circuit)		
C114	ECCD1H020C	2pf 50WV ±0.25pf Ceramic	1	Z
C110	ECCD1H040C	4pf 50WV ±0.25pf Ceramic	1	Z
C205	ECCD1H050C	5pf 50WV ±0.25pf Ceramic	1	Z
C109, 117 C116	ECCD1H070D	7pf 50WV ±0.5pf Ceramic	2	Z
107,216	ECCD1H080D	8pf 50WV ±0.5pf Ceramic	3	Z
C113,214	ECCD1H100K	10pf 50WV ±10% Ceramic	2	Z
C104	ECCD1H120K	12pf 50WV ±10% Ceramic	1	Z
C112	ECCD1H220K	22pf 50WV ±10% Ceramic	1	Z
C201	ECCD1H330K	33pf 50WV ±10% Ceramic	1	Z
C204	ECCD1H560K	56pf 50WV ±10% Ceramic	1	Z
C102,203, 232	ECCD1H101K	100pf 50WV ±10% Ceramic	3	Z
C230	ECCD1H181K	180pf 50WV ±10% Ceramic	1	Z
C115	ECCD1H100KV	10pf 50WV ±10% Ceramic	1	Z
C231,222	ECCD1H270K	27pf 50WV ±10% Ceramic	2	Z
C106,111, 202,206, 239	ECKD1H102MD	0.001mf 50WV ±20% Ceramic	5	Z
C207,208, 237	ECKD1H103MD	0.01mf 50WV ±20% Ceramic	3	Z
C223,226, 209,210	ECKD1H223MD	0.022mf 50WV ±20% Ceramic	4	Z
C108	ECKD1H102P	0.001mf 50WV +100,−0% Ceramic	1	Z
C103,105, 118,218, 221,224, 228,236, 310,311	ECKD1H223P	0.022mf 50WV +100,−0% Ceramic	10	Z
C302	ECKD1H333P	0.033mf 50WV +100,−0% Ceramic	1	Z
C308,309	ECKD1H153MD	0.015mf 50WV ±20% Ceramic	2	Z
C301	ECEA50V1	1mf 50WV Electrolytic	1	Y
C235	ECEA25V3R3	3.3mf 25WV Electrolytic	1	Y
C233	ECEA25V4R7	4.7mf 25WV Electrolytic	1	Y
C227,234, 238	ECEA16V10	10mf 16WV Electrolytic	3	Y
C305	ECEA6V33	33mf 6WV Electrolytic	1	Y
C307	ECEA10V33	33mf 10WV Electrolytic	1	Y
C306	ECEA6V100	100mf 6WV Electrolytic	1	Y
C217,312, 220	ECEA10V220	220mf 10WV Electrolytic	3	Y
C304	ECQM05153MZ	0.015mf 50WV ±20% Polyester	1	Z
C303	ECKD1H222MD	0.0022mf 50WV ±20% Ceramic	1	Z
C212	ECQS1241JZ	240pf 100WV ±5% Styrol	1	Z
C211	ECQS361JZ	360pf 100WV ±5% Styrol	1	Z
C213	ECQS392JZ	3900pf 100WV ±5% Styrol	1	Z
C219	ECQS152JZ	1500pf 100WV ±5% Styrol	1	Z
C215	ECQS1151JZ	150pF 100WV ±5% Styrol	1	Z
		(Control Amplifier Circuit)		
C503,504, 507,508	ECCD1H560K	56pf 50WV ±20% Ceramic	4	Z
C505,506, 515,516, 529,530	ECCD1H102P	0.001mf 50WV +100,−0% Ceramic	6	Z
C519,520	ECKD1H682MD	0.068mf 50WV ±20% Ceramic	2	Z
C523,524	ECKD1H223MD	0.022mf 50WV ±20% Ceramic	2	Z
C533,534	ECKD1H332MD	0.0033mf 50WV ±20% Ceramic	2	Z
C521,522	ECQM05683MZ	0.068mf 50WV ±20% Polyester	2	Z
C509,510	ECEA6V33	33mf 6WV Electrolytic	2	Y
C501,502	ECEA6V47	47mf 6WV Electrolytic	2	Y
C535,541	ECEA10V220	220mf 10WV Electrolytic	2	Y

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
C511,512, 513,514, 517,518, 527,528, 531,532	ECEA50V1	1mf 50WV Electrolytic	10	Y
C536	ECEA10V100	100mf 10WV Electrolytic	1	Y
C539,540	ECQM05103MZ	0.01mf 50WV ±20% Polyester	2	Z
C537,538	ECQM05333MZ	0.033mf 50WV ±20% Polyester	2	Z
C525,526	ECAG10ER15	0.15mf 10WV Electrolytic	2	Y
(Power Amplifier Circuit)				
C707,708	ECEA10V47	47mf 10WV Electrolytic	2	Y
C903	ECEA10V100	100mf 10WV Electrolytic	1	Y
C901	ECET16R3300S	3300mf 16WV Electrolytic	1	Y
C703,704	ECEA25V47	47mf 25WV Electrolytic	1	Y
C711,712	ECEA50V1	1mf 50WV Electrolytic	2	Y
C701,702	ECEA25M3R3	3.3mf 25WV Electrolytic	2	Y
C904,905	ECET35R332SU	33mf 35WV Electrolytic	2	Y
C902	ECKD1H223P	0.022mf 50WV +100, −0% Ceramic	1	Z
C705,706	ECKD1H102MD	0.001mf 50WV ±20% Ceramic	2	Z
C709,710	ECQM05473MZ	0.047mf 50WV ±20% Polyester	2	Z
C907	ECQM05334MZ	0.33mf 50WV ±20% Polyester	1	Z
C906	ECE25V2200	2200mf 25WV Electrolytic	1	Y
C908	ECQM05223MZ	0.022mf 50WV ±20% Polyester	1	Z
(Cassette Circuit)				
C814,813	ECAF16ER1	0.1mf 26WV Electrolytic	2	Y
C431,432, 803,804, 415,416, 423,424, 425,426	ECEA50V1	1mf 50WV Electrolytic	10	Y
C421,422, 805,806, 807	ECEA25V3R3	3.3mf 25WV Electrolytic	5	Y
C405,406	ECEA25V4R7	4.7mf 25WV Electrolytic	2	Y
C413,414	ECEA6V33	33mf 6WV Electrolytic	2	Y
C816	ECEA25V100	100mf 25WV Electrolytic	1	Y
C817	ECEA16V220	220mf 16WV Electrolytic	1	Y
C435	ECEA10V470	470mf 10WV Electrolytic	1	Y
C815	ECEA25V220	220mf 25WV Electrolytic	1	Y
C408,407	ECCD1H101K	100pf 50WV ±10% Ceramic	2	Z
C801,802	ECKD1H332MD	0.0033mf 50WV ±20% Ceramic	2	Z
C808,809	ECQS1221JZ	220pf 100WV ±5% Styrol	2	Z
C433,434	ECQS1152JZ	1500pf 100WV ±5% Styrol	2	Z
C812	ECQS1182JZ	1800pf 100WV ±5% Styrol	1	Z
C401,402, 409,410, 439,440, 417,418	ECQM05102MZ	0.001mf 50WV ±20% Polyester	8	Z
C419,420	ECQM05682MZ	0.0068mf 50WV ±20% Polyester	2	Z
C811,429, 430	ECQM05333MZ	0.0033mf 50WV ±20% Polyester	3	Z
C810	ECQM05104MZ	0.1mf 50WV ±20% Polyester	1	Z
C427,428, 403,404	ECQM05473MZ	0.047mf 50WV ±20% Polyester	4	Z
C436	ECEA16V470	470mf 16WV Electrolytic	1	Y
C437,438	ECEA50MR33	33mf 50WV Electrolytic	2	Y
C441,442	ECQM05223MZ	0.022mf 50WV ±20% Polyester	2	Z
(Others)				
C2	ECKDDS102MD	0.001mf 250WV +20% Ceramic	1	Z
C1	ECKDDS101MB	100pf 250WV +20% Ceramic	1	Z
C1	ECKDGS101MB3	100pf 250WV ±20% Ceramic (UK only)	1	Z
C5	ECKD1H223PF	0.022μF 50WV +100, −0% Ceramic	1	Z

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
VARIABLE RESISTORS				
VR501 ~ 504	EWK8EA331A54	50kA, Bass and Treble Control	2	X
VR505,506	EWFN3AK30A54	50kA, Volume Control	1	X
VR507	EVH1UA363G54	50kG, Balance Control	1	X
VR301	EVLT4AA00B14	10k, Separation Control	1	X
VR401,402	EWKEVA331A24	20kA, REC Level Control	1	○X
VR801	EVLS3AA00B13	1k, AC Bias Oscillator	1	X
VARIABLE CAPACITORS				
CT101,102	SCVC158J124K	Tuning Capacitor	1	○X
CT103	ECV1ZW10X32	Trimmer Cpacitor	1	X
CT201 ~ 206	SCV3T12S	Trimmer Capacitor	2	X
SWITCHES				
SF1 ~6	SSR72K	Function Selector Switch	1	○X
SB	SSR76K	Band Selector Switch	1	X
S1	ESB7067	Power Switch SAFETY	1	X
S2	ESB3742	Power Voltage Selector SAFETY	1	X
S3	SSH52	Tape Monitor Switch	1	X
S4	SSH32	Speaker Selector Switch or Mode (UK only)	1	X
ST1 ~ 12	SSS60	REC/PLAY Switch	1	X
S5	SSH50	Tape Selector Switch	1	○X
S6	–	Refer to Ref. No. 26 on page 17.		
S7	–	Refer to Ref. No. 49 on page 17.		
S8	–	Refer to Ref. No. 18 on page 18.		
S9	–	Refer to Ref. No. 19-1 on page 18.		
CHASSIS				
CH1	SUV108	Cover, Power Switch	1	Z
CH2	SDA32	Holder, Dial Pointer	1	Z
CH3	SHG950	Rubber Cushion	3	Z
CH4	SDP580	Dial Pointer	1	Z
CH5	RHG211	Rubber Cushion, Lamp	2	Z
CH6	RHG3-1	Rubber Cushion, Line ANT	1	Z
CH7	SDD46K	Dial Drum	1	Z
CH8	RDS4170A	Spring, Dial	1	Z
CH9	RDR20	Pulley	4	Z
CH10	RDR23	Pulley	1	Z
CH11	RNW150-2	Washer, Pulley	5	Z
CH12	RDZ05-A	Dial Cord	165cm	Z
CH13	SDT9302K	Tuning Shaft	1	Y
CH14	RDY36	Pulley Shaft	5	Z
CH16	SHR112	Clamp, Power Cord	2	Z
CH17	RHR969ZA	Latch	8	Y
CH18	SUS184	Spring	4	Y
CH19	RHG109	Rubber Cushion, F ANT	2	Z
CH20	SUD114	Spacer, Headphone Jack	1	Y
CH21	SUD74	Stud	1	Y
CH22	SHR9016	Cover, Dial Pointer	1	Y
CH23	SUD84	Stud (UK only)	2	Y
CH24	SUD92	Stud, Record Player Mounting	2	Y
CH25	XTV3+8BR	Screw	8	Z
CH26	XTW3+8B	Screw, w/Washer	7	Z
CH27	XYN4+C10S	Screw	4	Z
CH28	XWE4E13	Washer	4	Z
CH29	SNE416	Nut, Headphone	1	Z
CH30	SJJ90	Headphone Jack	1	Y
CH31	SJF104	1P Fuse Holder	1	Y
CH32	RJF7A	Fuse Holder	6	Y
CH33	SJS9202-1	Terminal Board, FM ANT	1	Z
CH34	SJS9206-1	Terminal Board, AM ANT	1	Z
CH35	SJF9206	Terminal Board, REC and AUX	1	Z
CH36	SJF9404	Terminal Board, SPKR	1	Z
CH40	SJR608	Terminal Strip, 6P	1	Z
CH41	SJR202	Terminal Strip, 2P	1	Z
CH42	SJA46	Power Cord (FINCO, DEMKO, SEMKO, HO)	1	Y
CH42	SJA68	Power Cord (SEV)	1	Y
CH42	SJA110	Power Cord (UK)	1	Y
CH42	SJA88	Power Cord (GF, GF-2)	1	Y
CH43	SUD112	Stud	1	○Z

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
CH44	RJJ78	Mike Jack	2	Y
CH46	SNE420	Nut, Mike Jack	2	Y
CH47	SXE98	Cassette Arm Assembly	1	○ Z
CH50 (MC1)	SWK134	3P Connector Jack	1	Z
CH51 (MC3)	SWK136	5P Connector Jack	1	Z
CH52 (MC4)	SWK138	3P Connector Jack	1	Z
CH53	SWP64	Phono Output Lead Assembly	1	Z
CH54	SUS180	Spring, Cassette Arm	1	Y
CH55	SWP66	1P Connector, Male	1	Z
CH56	SWK126	1P Connector, Female	1	Z
CH57	XYN26+C6S	Screw, 2.6mm w/Washer, Cassette Panel Mounting	2	Z
		ACCESSORIES		
A1	WM2201N	Mike	1	Y
A2	WN133	Mike Stand	1	Y
A3	SQX5698	Operating Instructions (UK)	1	○ Z
A3	SQX5666	Operating Instructions (SEM, DEM, FIN)	1	○ Z
A3	SQX5682	Operating Instructions (GF, GF-2, SEV, HO)	1	○ Z
		PACKING		
PA1	SPG1736	Carton	1	○ Z
PA2	SPN2352	Pad (R)	1	○ Z
PA3	SPN2354	Pad (L)	1	○ Z
		CABINET		
	SKA1440	Cabinet Assembly	1	○ X
	SKA1442	Cabinet Assembly (UK only)	1	○ X
CA1	SHG9058	Rubber Cushion, Dust Cover	2	Y
CA2	SYU280	Bottom Cover Assembly	1	○ X
CA3	SYL6-1	Foot Assembly	4	Y
CA4	SGE638	Dust Cover	1	○ X
CA5	SKU2060	Rear Board (UK only)	1	○ X
CA5	SKU2061	Rear Board	1	○ X
CA6	SYP214	Escutcheon Assembly	1	○ X
CA6	SYP216	Escutcheon Assembly (UK only)	1	○ X
CA7	SGL88	Stereo Eye	1	Z
CA8	SBN628K	T Knob	1	X
CA9	SBN654K	V Knob	6	X
CA10	SXE100	Front Panel Assembly	1	X
CA13	SBC186	Power Button	1	X
CA14	RBC95ZA	Push Button	3	X
CA15	SBH5502	Hinge	1	Z
CA16	SXE88	Hook Assembly	1	Y
CA17	SYE402	Cassette Panel Assembly	1	○ Y
CA18	SYE394	Cassette Cover Assembly	1	○ X
CA19	XWES3F18	Spacer 18φ, Cassette Panel Mounting	2	○ X
CA20	SME152	Plate, Mike Jack	1	○ Z
CA21	SDN656K	Knob, REC	1	○ X
CA22	SBC158-1	Reset Button	1	Z
CA23	SUW932-1	Holder, Reset Button	1	Z
		SPEAKER SYSTEM (SB-250L(P) ..... GF-2 Only)		
	SKA1501	Speaker Enclosure	2	X
	SYB166	Baffle Board Ass'y	2	X
	SKU2120	Rear Board	2	X
	SGN2600	Name Plate	2	Y
	RGB159A	Badge	2	Y
	SJP2206	Speaker Cord	2	X
	EAS20PL116SA	Woofer, 20 cm, 4 ohm	2	X
	EAS5PH15SC	Tweeter, 5 cm, 8 ohm	2	X
	ECEA25Y3R3	Electrolytic	2	Y
	SJR202	Terminal Strip	2	Z
	SPG1724	Carton	1	Z
	SPN2346	Pad	2	Z

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
		(SB-207L ..... UK Only)		
	SKA1500	Speaker Enclosure	2	X
	SYB166	Baffle Board Ass'y	2	X
	SKU2120	Rear Board	2	X
	SGN2580	Name Plate	2	Y
	RGB159A	Badge	2	Y
	SJP2206	Speaker Cord	2	X
	EAS20PL116SB	Woofer, 20 cm, 8 ohm	2	X
	EAS5PH15SC	Tweeter, 5 cm, 8 ohm	2	X
	ECEA25Y3R3	Electrolytic Capacitor, 3.3μF, 25WV	2	Y
	SJR202	Terminal Strip	2	Z
	SPG1726	Carton	1	Z
	SPN2346	Pad	2	Z
		CASSETTE TAPE DECK (SJD58-1)		
1	SYE340	Push Button, REC	1	Y
2	SYE342	Push Button	6	Y
3	SMQ1232	REC Safety Lever	1	Z
4	SMQ662	Spring, REC Safety Lever	1	Y
5	SNE432	Circlip, REC Safety Lever	1	Y
6	SJH30	R/P Head	1	X
7	SJH32	Erase Head	1	X
8	SMQ678	Spring, R/P Head and Flywheel Bracket	2	Y
9	SMQ1360	Spring A, Head Panel	2	Y
10	SMQ1362	Head Base	1	Z
11	SMQ1388	Eject Stop Lever w/Spring	1	Z
12	SMQ1390	Auto-Stop Lever Assembly	1	Z
13	SMQ1392	Spacer, Auto-Stop Lever	1	Z
14	SMQ1364	Pressure Roller Assembly	1	X
15	SMQ1366	Spring, Pressure Roller	1	Y
16	SMQ1448	Reel Assembly	2	Y
17	SMQ1348	Tape Counter	1	Y
18	SMQ1056	Counter Belt	1	X
19	SMQ1354	Brake Arm	1	Z
20	SMQ1358	Spring, Brake Arm	1	Y
21	SMQ1394	Spring, Tape Holder	1	Y
22	MHT5PS	Motor	1	X
23	SMQ1384	Motor Pulley w/Screw (XXA2A-3)	1	Y
24	SMQ716	Rubber Cushion, Motor	3	Z
25	SMQ718	Spacer, Motor	3	Z
26	SMQ1378	Motor ON-OFF Switch (S6)	1	X
27	SMQ1396	Eject Slide Lever w/Spring	1	Z
28	SMQ1374	Spacer A, Eject Slide Lever	1	Z
29	SMQ1398	Spacer B, Eject Slide Lever	1	Z
30	SMQ1368	Clutch Assembly w/Spring	1	Z
31	SMQ1370-1	Bearing	1	Z
33	SMQ148	Washer, Oil Thrower	2	Z
34	SMQ1402	Nylon Washer	1	Z
35	SMQ686	Flywheel	1	Y
36	SMQ1372	Main Belt	1	X
37	SMQ1404	Flywheel Bracket	1	Z
38	SMQ1382-1	FF Arm Assembly w/Spring	1	Z
39	SMQ1406	Brake Operating Plate	1	Z
40	SMQ1408	Rewind Arm w/Spring	1	Z
41	SMQ1386	Rewind Idler	1	Z
42	SMQ1410	Pause Lever	1	Z
43	SMQ1412	Spacer, Pause Lever	1	Z
44	SMQ1414	Pause Slide Lever A w/Spring	1	Z
45	SMQ1416	Pause Slide Lever B	1	Z
46	SMQ1376	Pause Click Lever	1	Z
47	SMQ1418	Spring, Pause Click Lever	1	Y
48	SMQ1528	Bracket, Amp. Switch	1	Z
49	SMQ1380	Amp. Switch (S7)	1	X
50	SMQ1422	REC Slide Lever	1	Z
51	SUS202	Spring Plate, REC Switch	1	Y
52	SMQ1426	Spacer, REC Slide Lever	1	Z
53	SMQ1428	Shaft, FF and Rewind Lever	1	Z
54	SMQ1430	Rewind Lever	1	Z
55	SMQ1432	FF Lever	1	Z
56	SMQ1434	Nylon Washer 6.1φ	1	Z
57	SMQ1436-1	Kick Lever, Auto-Stop	1	Z
58	SMQ1438	Spacer, Kick Lever	1	Z
59	SMQ1530	Play Lever	1	Z
60	SMQ1524	Spacer, Play Lever	1	Z
61	SMQ1444	Spring B, Head Panel	1	Y
100	XYN2+C5	Screw 2mm×5	3	Z
101	XSN2+5	Screw 2mm×5, Muting Switch	1	Z
102	XSS2+5	Screw 2mm×5	1	Z
103	XSN2+10	Screw 2mm×10	3	Z

REPLACEMENT PARTS LIST (Cont'd)

Ref. No.	Part No.	Description	Per Set (pcs.)	Remarks
104	XYN26+5	Screw 2.6mm × 1	5	Z
105	XSN26+6	Screw 2.6mm × 6	5	Z
106	XSB26+4	Screw 2.6mm × 4, Head Panel	1	Z
107	XSB26+6	Screw 2.6mm × 6, Head Panel	1	Z
108	XSN26+10	Screw 2.6mm × 10	1	Z
109	XSS3+5S	Screw 3mm × 5, Counter Mounting	2	Z
110	XYN3+C6S	Screw 3mm × 6, REC Spring	1	Z
111	XSN2D6	Screw 2mm × 6	1	Z
112	XWE2A6	Washer 2φ	3	Z
113	XWE26D7	Washer 2.6φ, 0.5t	4	Z
114	XWE26E10	Washer 2.6φ	1	Z
115	XYN26+C6	Screw 2.6mm × 6, Play Lever	1	Z
150	XUC12FT	Circlip 1.2φ	2	Z
151	XUC15FT	Circlip 1.5φ	4	Z
152	XUCS19	Circlip 1.9φ	1	Z
153	XUC2FT	Circlip 2φ	2	Z
155	XUC25FT	Circlip 2.5φ	1	Z
156	XUC32FT	Circlip 3.2φ	1	Z
157	XUC4FT	Circlip 4φ	2	Z
		RECORD PLAYER (SAP-825DM)		
1	SFTE623-1	Turntable	1	
1-1	SFTG829-02	Turntable Rubber	1	
1-2	SFTK809-01	Trim, Turntable	1	
2	SFGB321-1	Belt	1	
3	SFBP825D01E	Main Plate Assembly	1	
4	SFTU825E01E	Turntable Shaft Assembly	1	
4-1	SFTJ623-1E	Turntable Shaft	1	
4-2	XTV3+5BFU	Self Tapping Screw	1	
4-3	XTV3+6BFU	Self Tapping Screw	3	
4-4	SFER1C	Lug	1	
5	SFWE154A1	45 RPM Adaptor Complete	1	
5-1	SFKT823-1	Adaptor Holder	1	
5-2	XNG4BFU	Nut	1	
6	SFKU829E01	Pickup Arm Rest Assembly	1	
6-1	XWA4BFU	Spring Washer 4φ	1	
6-2	XNG4HFU	Nut	1	
7	EPU-35SMHD	Pickup Arm Assembly	1	
7-1	SFP-CC3501K	Shell Assembly	1	
7-2	SFP-WG3501K	Balance Weight Assembly	1	
7-3	SFP-AM3501K	Pickup Base	1	
7-4	XWA4BF	Washer 4φ	2	
7-5	XNG4BFU	Nut	2	
7-6	SFUP623-1	Protection Cover	1	
7-7	SFP-RT3500K	Lifter Assembly	1	
7-8	SFUM623-1	Lifter Fixing Cam	1	
7-9	SFP-SP3500	Spring, Pickup	1	
7-10	SFXN623-1	Nut	1	
7-11	XSN3+16FU	Self Tapping Screw	1	
7-12	SFQA829-03	Spring, Lifter	1	
8	SFUG825C01A	Main Gear Assembly	1	
8-1	XUC5FY	Circlip	1	
9	SFKT623-1E	Play/Cut Knob Assembly	1	
9-1	SFXB530-1	Play/Cut Lever Base	1	
9-2	XWA9BFU	Spring Washer	1	
9-3	SFXN530R1	Nut	1	
9-4	SFUP825C02E	Play/Cut Lever Assembly	1	
9-5	XUC5FY	Circlip 5φ	1	
9-6	SFUM623-6	Cut Plate	1	
9-7	SFQH831-1	Spring, Cut Plate	1	
10	SFUM623-4E	Operating Cam Assembly	1	
10-1	SFQH623-02	Spring, Operating Cam	1	
10-2	SFXG623-2	Pivot Screw	1	
10-3	SFUM623-5A	Pickup Arm Fixing Plate	1	
11	SFUC633-1E	Starting LèEVER Assembly	1	
11-1	CSTW-3	Circlip	1	
12	SFXG623-05	Switch Lever Shaft	1	
12-1	XNG3BFU	Nut	1	
12-2	XWA3BF	Spring Washer	1	
12-3	SFUM623-09	Switch Lever	1	
12-4	XUC4FY	Circlip	1	
13	SFUB827-01E	Operating Plate Assembly	1	
13-1	SFQH623-1	Spring, Operating Plate	1	
	XUC5FY	Circlip 5φ	1	
	XUC4FY	Circlip 4φ	1	
	SFXW028-01	Washer	1	
14	SFUM825C02	Cueing Cover	1	
15	SFUK825H02A	Cueing Lever Assembly	1	
15-1	SFUK825C01E	Bracket, Cueing Lever	1	
15-2	SFUP825D02	Cueing Lever	1	
15-3	SFXW829T02	Washer	1	
15-4	XUC5FY	Circlip 5φ	1	
15-5	SFUM825C01	Cueing Cam	1	
15-6	XUC3FY	Circlip 3φ	1	
15-7	SFQH825H01	Spring, Cueing	1	
16	SFMF825D01	Motor Plate Holder Assembly	1	
16-1	SFMC020L01E	Motor Assembly w/Governor Circuit	1	
16-2	SFXO020L01	Stud, Motor Mounting	3	
16-3	SFGC020L01	Rubber Cushion	3	
16-4	XWE26D75BW	Washer	3	
16-5	XYN26+C8FU	Screw, Motor Mounting	3	
16-6	SFUZ825H01	Insulating Sheet	1	
16-7	XTV3+6BFU	Screw, Motor Plate Holder	4	
17	SFDA825H01A	Power Source Plug Assembly	1	
17-1	SFUP530-1	Lead Clamper	2	
17-2	SFGT829T02	Rubber Tube	1	
17-3	XTN3+6BFU	Screw	2	
18	SFDS-AM9688	Micro Switch (S8)	1	
18-1	XTN3+18BFU	Screw, Micro Switch Mounting	1	
19	SFUM825C02	Speed Selector Cover	1	
19-1	SFDS825H01A	Speed Selector Switch Assembly (S9)	1	
19-2	SFDS-T-129LM	Speed Selector Switch	1	
19-3	SFUP825D01	Switch Base	1	
19-4	SFKT825D01	Switch Lever	1	
19-5	XTV3+6BFU	Screw, Switch Mounting	2	
20	SFQC925-01	Spring, Cushion	4	
20-1	SFXO929-02	Spacer	4	
20-2	XYN4+C10FU	Screw	4	
20-3	SFUZ929-01	Cushion A	4	
20-4	SFCZ929-01	Cushion B	4	
21	SFUP829A01E	PU Output Socket Assembly	1	
21-1	XTV3+6BFU	Screw	2	
	SFNN825H01	Name Paper	1	
	SFNZ825H01	Caution, Clamp	1	
	SFNH825H01	Label, Stylus	1	
	SFNZ020C03	Caution, Safety	1	
	EPC-78SMBD	Cartridge w/Stylus	1	
	EPS-35STSD	Stylus, Diamond	1	

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